

REPORT ON
PROJECT BASED LEARNING

Academic Year: 2020-2021

Class: Third Year (Mech/Auto)

Semester: V CBCGS

The department of Mechanical & Automobile engineering has floated the problem on developing virtual experiments of their choice using software with which they are acquainted for the PBL.

The Scope of the topic:

- A virtual experiment is a powerful educational tool that enables students to conduct experiments at the comfort of their home. An excellent opportunity to engage students with technology and in parallel to avoid unforeseen disruptions, as happened recently due to pandemic.
- Virtual experiments can provide a powerful solution for students during COVID-19 pandemic. Students can progress to their studies without any disruptions since important experiments can be conducted online at home.
- Development of such virtual experiments will provide the student with a great exposure to design the experiments in a way they want to analyze the parameters and synthesis the input.

Objectives:

- As PBL problem that involves the students to develop some hardware solution is not possible due to current pandemic scenario. There is need to undertake PBL that involves simulation/analysis using software etc.
- This will develop software skill of the student.
- Students are required to design the experiments of the area/topic of their interest.
- Students can select the topic/experiment in consultation with subject teacher/mentor who guides the student in selection of the experiment and development of software.
- Students were instructed to design the experiment using any programming language/software.

Students have carried out the development of virtual experiments on the following topics.

The topics selected are from the syllabus of the Mumbai University.

Mechanical Engg

- Study of Fuel Injection System (C. I. Engine)
- To determine the natural frequency for longitudinal vibrations of helical spring
- To determine poles and zeroes and plot root locus graph
- Study of Logic Gates & Root locus - Bode plot from transfer function
- PD control for an automated system
- Determination of thermal Conductivity of insulating powder
- Determine type of damping, damping ratio & natural frequency of given system.
- Heat transfer through Insulating Powder
- Archimedes Principle
- Heat transfer by conduction
- Critical Radius of Insulation or Effect of Area On The Heat Transfer
- Heat transfer from Extended Surfaces (Fins)
- Morse Test
- Bifilar Suspension, Simple Pendulum, Compound Pendulum
- Determination of Time Response
- Study the Carburetors
- OHMS LAW
- To develop speedometer (Generalized Measurement system)
- Conductivity of insulation powder
- SPRING TEST
- FLOW THROUGH VENTURIMETER
- Orifice Meter
- Determination of time response specification of given time

Automobile Engg

- To check stability of system using Routh's criteria
- Dismantling and Assembly of Ignition system
- Dismantling and Assembly of Brakes (Disc and Drum)
- Study of fuel injection system
- Dismantling & Assembly of Transmission
- Dismantling and Assembly of Differential
- Dismantling and Assembly of Brakes (Disc and Drum)
- Dismantling and Assembly of Steering Gear box
- Dismantling and Assembly of Alternator
- Determining the emissivity of a given material
- Working of Lighting and wiring system in automobile
- Working of Sensors and Actuators in Automobiles
- State space analysis
- Dismantling and Assembly of UV joint of Propeller Shaft
- Working of Sensors and Actuators in Automobiles
- Dismantling and assembly of Clutch
- Dismantling and assembly of Clutch

- Working of Sensors and Actuators in Automobiles
- Working of Sensors and Actuators in Automobiles

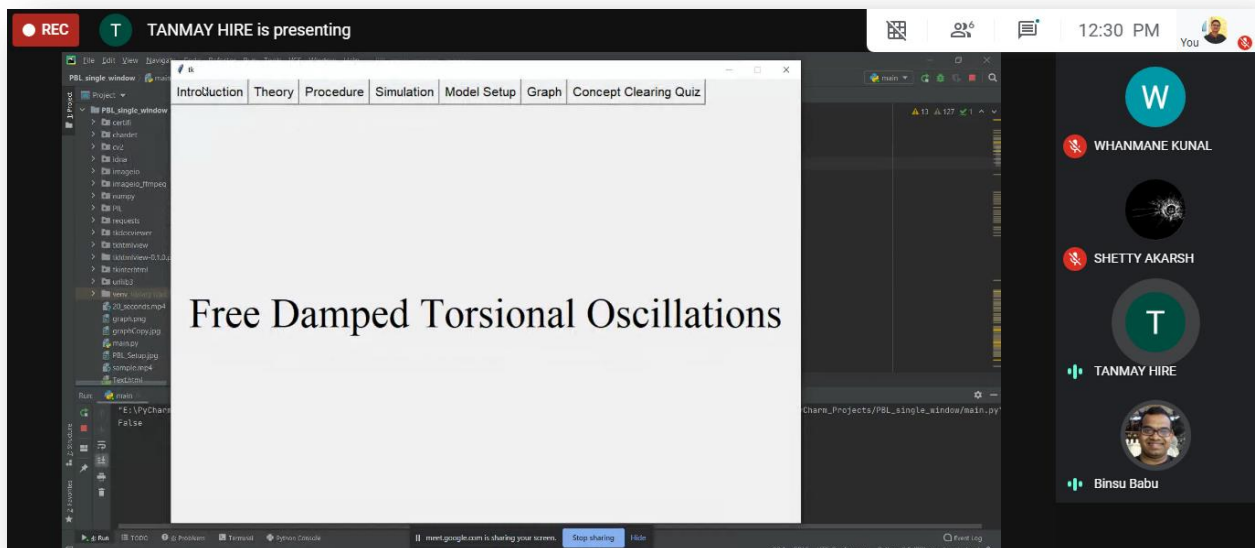
Students have learned and used the following software for developing virtual experiments.

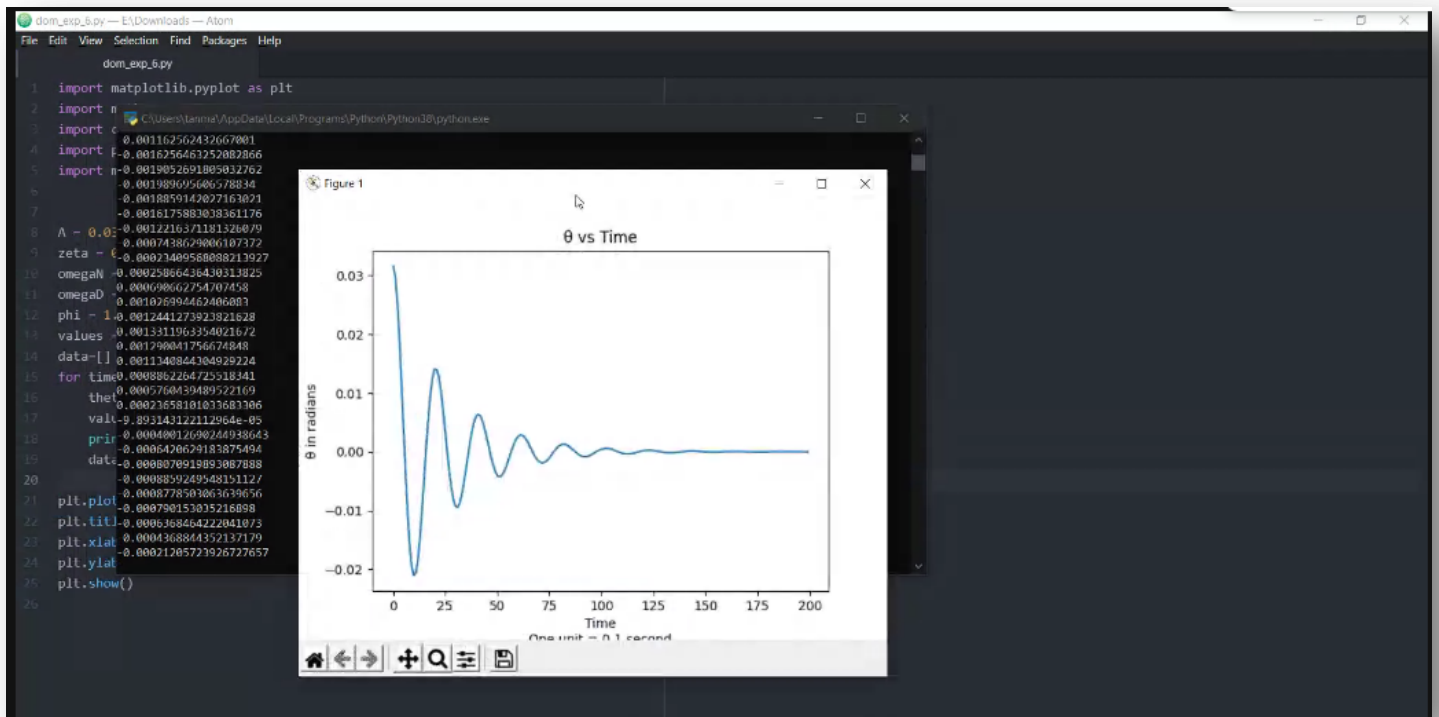
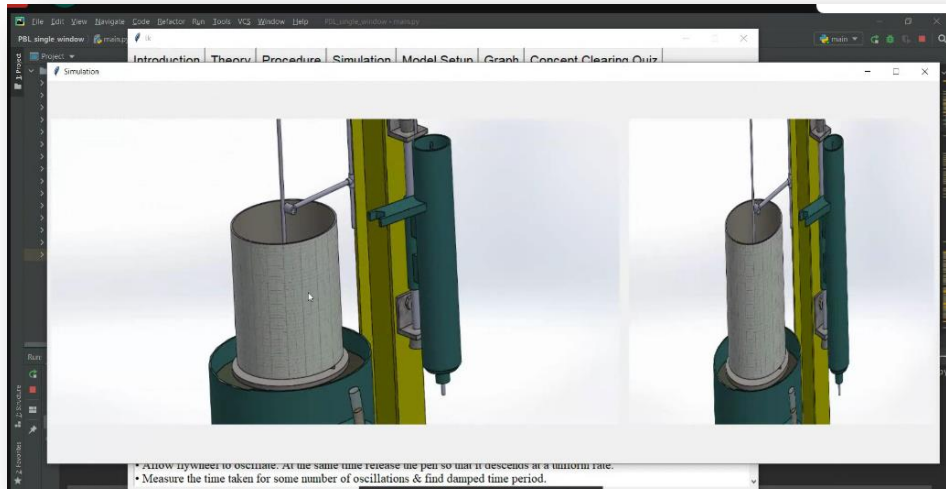
- G programming
- Python
- Matlab
- HTML
- Java Script
- Turbo C++
- C++
- Solidworkds,
- Labview

Video Link

<https://drive.google.com/file/d/1YEFvFUqDD5Yjj7TRMUrWrTQfCHoKwZ2J/view?usp=sharing>

Snapshots of the PBL Evaluation





REC OM KULKARNI is presenting CHAVAN TEJAS and 18 more

TE MECH-A(2020-21) SEM-V ICE | TE MECH-A STUDENT PBL GROU | Meet - vbo-N8E4-P | PBL VENTURIMETER - Google Di | drive.google.com/drive/folders/1Z2ENg00ovhX1_c1GWB7ZDyJKyuaT

Code, Compile, Run and Debug online from anywhere in world.

PROGRESS:

meet.google.com is sharing your screen. Stop sharing Hide

adashramnair.github.io/PBL_Group_2/compound/compound_compare.html | meet.google.com is sharing your screen. Stop sharing Hide

VIRTUAL EXPERIMENTS

Compound Pendulum

- Aim
- Theory
- Procedure
- Calculate Result
- Compare Result

[Back to Main screen](#)

Verify Practical Performance:

- For Compound Pendulum with Uniform Cross Section:
- ▼ For Compound Pendulum with Non-Uniform Cross Section:

Number of oscillations	Total time taken (sec)	Time Period (sec)
4	10	
3	7	
0	0	0

Calculate time period

Radius of Gyration [k] (cm)

Dist. of C.G. to the point of rotation [h] (cm)

Verify

Displacement position

Equilibrium position

NAIR ADARSHRAM

Group 2 - MEA 502, 510, 555, 562

ENTER THE DETAILS BELOW

Make	BMW
Model	BMW X5
Year	2018
Color	Yellow

Speedometer

59 mph

1000

Shipa Mondkar

Coding for Design of Navigation bar

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<nav>
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    <li>Home</li>
    <li>About</li>
    <li>Services</li>
    <li>Contact Us</li>
  </ul>
</nav>

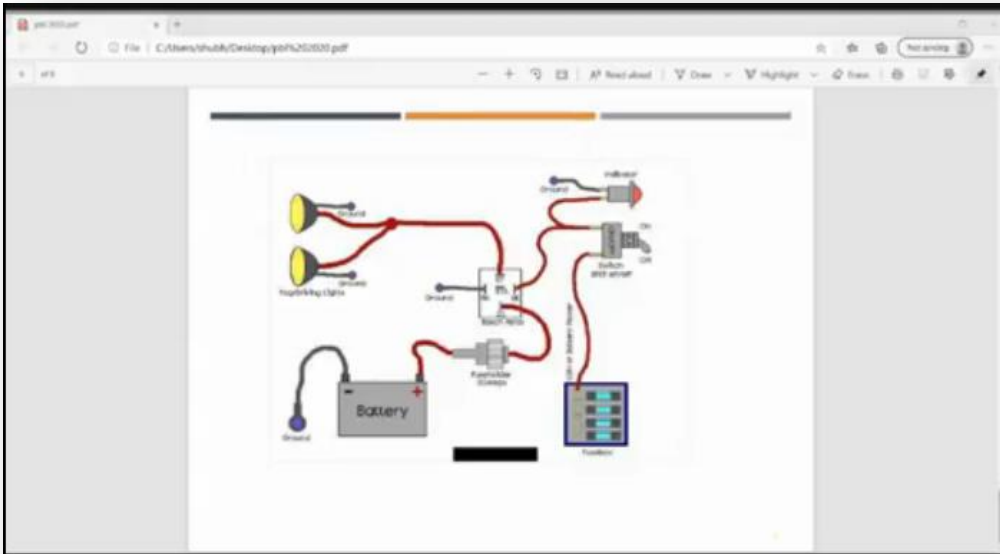
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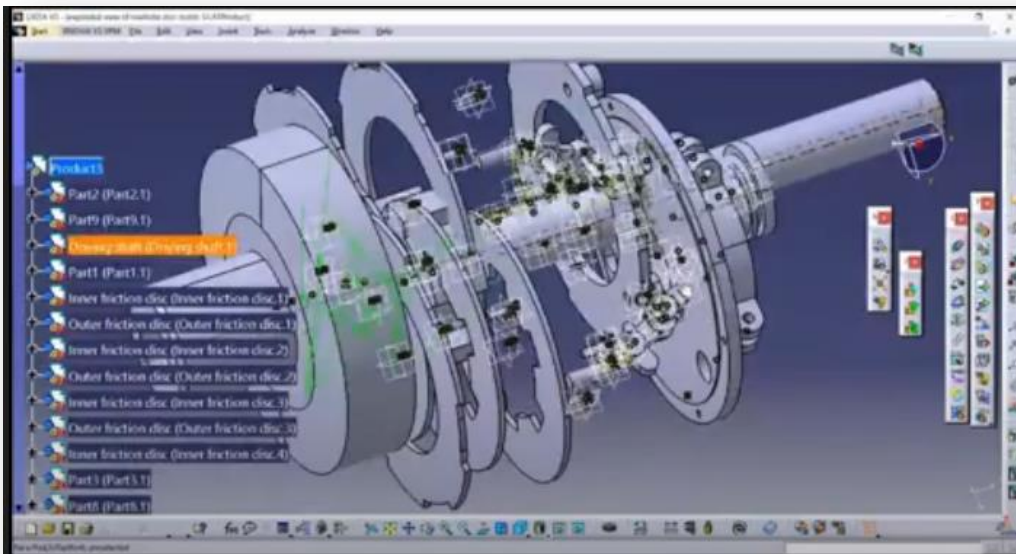
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    $(".nav-item").click(function() {
      $(this).parent().parent().find(".active").removeClass("active");
      $(this).parent().parent().find(".active").addClass("active");
    });
  });
</script>

```

Birisu Babu



Richa Agrawal



RAI KAUSHAL VIRENDRA